

Amendment under 37 CFR §1.116
Application No. 10/512,141
Attorney Docket No. 042887

REMARKS

Rejections under 35 USC §103(a)

Claims 1, 3, 5-9, 11 and 12 were rejected under 35 USC §103(a) as being unpatentable over Loewenhardt et al. (U.S. Patent No. 5,942,889) in view of Biricik et al. (U.S. Patent No. 5,173,443).

Claim 1 has been amended to recite “the probe electrode covers the dielectric member except a peripheral area of the dielectric member.” The amendment is supported in the specification, for example, at page 10, lines 10-15.

Loewenhardt et al discloses a capacitive probe for in situ measurement of the DC bias voltage accumulated on a semiconductor wafer while being processed in a semiconductor wafer processing system. As pointed out in the previous response, according to Loewenhardt et al, the probe is made of copper foil, which is not transparent. The non-transparent probe obstructs the function of the viewing port. Because the probe obstructs the view, the probe must be restricted to a small area. Therefore, the probe disclosed in Loewenhardt et al is limited to uses where a large area is not required for a probe electrode. Thus, there is difficulty, in Loewenhardt et al, to secure sufficient sensitivity of the probe for such uses as plasma monitoring. Loewenhardt et al does not even realize the problem, much less how such a problem can be solved.

The Office Action alleged that Biricik et al discloses the advantages as view port, shield and electrode which would motivate a person of ordinary skill in the art to use them for theses advantages in Loewenhardt et al.

Although Biricik et al lists uses of a transparent conductive window such as resistance **heated windows**, electro magnetic interference (EMI) **shielded windows**, **anti-static windows** and **transparent electrodes** (column 1, lines 30-35), these are uses where the user simply takes advantage of the transparency of conductive window. Biricik et al discusses nothing about a plasma monitoring device for which great accuracy is required in detecting the abnormal discharge.

Moreover, Biricik et al does not teach or suggest that an optically transparent electro-conductive substance as the probe electrode makes it possible to improve sensitivity of the probe. The probe electrode can be made extremely larger in a viewing port than when non-transparent electro-conductive material is used because the transparent electro-conductive substance does not obstruct the view.

In detecting abnormal discharge in semiconductor process, minute changes in physical quantity have to be converted into electrical signals. In the measurement engineering, it is the most important how the changes in the initial physical quantity are detected and converted into electronic signals with minimum noise. In the present case, in order for an optically transparent electro-conductive substance to function as a detection electrode, the probe electrode covers the dielectric member except a peripheral area of the dielectric member. Thus, the area of the detection electrode can be maximized to obtain the maximum sensitivity.

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Amended claim 1 recites “the probe electrode covers the dielectric member except a peripheral area of the dielectric member.” Loewenhardt et al and Biricik et al do not teach or suggest the specific structural feature.

Thus, the combination of Loewenhardt et al and Biricik et al does not teach or suggest modifying the disclosure to make into the claimed invention.

For at least these reasons, claim 1, as amended, patentably distinguishes over Loewenhardt et al and Biricik et al. Claims 3, 5-9, 11 and 12, directly or indirectly depending from claim 1, also patentably distinguish over Loewenhardt et al and Biricik et al for at least the same reasons.

Claim 2 was rejected under 35 USC §103(a) as being unpatentable over Loewenhardt et al. (U.S. Patent No. 5,942,889) in view of Biricik et al. (U.S. Patent No. 5,173,443) as applied to claims 1, 3, 5-9, 11 and 12 and further in view of Turner et al (U.S. Patent No. 5,576,629).

Claim 2 depends from claim 1, which patentably distinguishes over Loewenhardt et al and Biricik et al.

Turener et al has been cited for allegedly disclosing electrical sensors being used with amplifiers to amplify signals in order to use for control and monitoring. Such disclosure, however, does not remedy the deficiencies of Loewenhardt et al discussed above.

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For at least these reasons, claim 2 patentably distinguishes over Loewenhardt et al and Turner et al.

Claim 10 was rejected under 35 USC §103(a) as being unpatentable over Loewenhardt et al. (U.S. Patent No. 5,942,889) in view of Biricik et al. (U.S. Patent No. 5,173,443) as applied to claims 1, 3, 5-9, 11 and 12 and further in view of Saito et al (U.S. Patent No. 6,562,186).

Claim 10 depends from claim 1, which patentably distinguishes over Loewenhardt et al and Biricik et al.

Saito et al has been cited for allegedly disclosing a flange to attach the window to the chamber. Such disclosure, however, does not remedy the deficiencies of Loewenhardt et al discussed above.

For at least these reasons, claim 10 patentably distinguishes over Loewenhardt et al and Saito et al.

Corresponding Patent and Related Facts

The Japanese national stage application 2002-122240 (laid-open application publication 2003-318115) has been resistered as Japanese patent No.3,773,189. There are already inquiries and on-going license negotiations on the present invention.

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The attached documents show an article published by the inventors and a news article reporting about the present invention. Thus, the present invention is attracting international attention. The fact indicates that there had not been a plasma monitoring device with practical accuracy for detecting abnormal discharge in semiconductor processes. Although there had been some known monitoring devices for detecting abnormal discharge of strong arc discharge, such devices are not applicable for detecting abnormal discharge in semiconductor processes.

Thus, the present invention is not obvious over the prior art and it significantly contributes to the relevant industry.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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Attachments: IEEE pages 371-374;
Semiconductor International report dated 11/1/2005.

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